JPRS 75894

17 June 1980

# East Europe Report

## SCIENTIFIC AFFAIRS

No. 676

FBIS FOREIGN BROADCAST INFORMATION SERVICE

## NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

## PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 75894

17 June 1980

# EAST EUROPE REPORT

## SCIENTIFIC AFFAIRS

No. 676

## CONTENTS

INTERFERON EXPERIMENT ABOARD SALYUT-6, SOYUZ-35

LD291937 Budapest MTI in English 1758 GMT 29 May 80

[Text] Budapest, 29 May (MTI)--Miklos Pek, MTI's special correspondent reports:

The international crew on the SALYUT-6 space station continued on Thursday the medical-biological experiment called "interferon" which they began the day before. Interferon is a material which forms in the human organism for resistance against the various virus infections, the damages caused by bacteriums. Interferon was discovered over twenty years ago.

The microbiological research group of the Hungarian Academy of Sciences has been dealing with Interferon research in its virus-laboratory for more than ten years. They have stated, among others, that the interferon formation has a radiation protecting effect and its advantage over other materials is that it does not reduce work performance.

During the "interferon-2" experiment the cosmonauts will examine how cosmic circumstances affect the various interferon pharmaceuticals packaged in synthetic ampoules in a lophilized, gel and liquid state, and how it affects their anti-viral effect. If the outcome of the experiment is favourable then these pharmaceuticals will also be a part of the medicine cabinet of every spacecraft. This would be important for those who participate in lasting space flights, since the latent virus infections cannot be completely diagnosed prior to launching today.

During the Thursday programme, the Kubasov-Faraks pair will also have to fill out the psychological questionnaire developed by Soviet and Hungarian specialists. The experiment, labelled "Opros," was first included in the progammes of international space flights on Polish recommendation, and this experiment has since been carried out a number of times.

This time Valery Kubasov and Bertalan Farkas will have to answer the questions covering nine themes. Psychologists would like to know how cosmic circumstances modify, among others, the appetite, eating habits, sleeping, perception and movement activity of the cosmonauts.

Hungarian and Soviet specialists worked out a supplementary questionnaire to the questions which have already been answered by the international crews of previous flights, for testing personality patterns on the basis of self-rating. On the basis of the psychologocial evaluation of the replies to the questions, researchers gain data on whether changes in personality components which were already tested earlier under ordinary conditions on earth take place and if so in what direction.

CSO: 2020

ESZR CONSOLES FUNCTIONS, USES DESCRIBED

Budapest SZAMITASTECHNIKA in Hungarian Apr 80 p 6

[Article by Peter Keszthelyi: "ESZR Consoles"]

[Text] Thus far in this series we have dealt with line printers and punch card and punch tape peripherals in our description of the multiplex peripherals of the ESZR [Uniform Computer Technology System] computers. It is now time to report on the consoles.

The console is the most important tool for maintaining contact between the computer and the operator. The operator uses this to give instructions to the computer about the way to run the program and the machine sends messages and answers through the console, when necessary asking for help.

In our homeland we use many types of consoles with the various ESZR computers, virtually a different one for every computer type. The console for the R-20 was the ESZ-7070, later the ESZ-7077; that for the R-20B and the R-22B (of Bulgarian manufacture) is the ESZ-7074; for the R-22 the ESZ-7077; for the R-30 the ESZ 7070; for the R-32 first the ESZ-7070 but now the ESZ-7076; and for the R-40 the ESZ-7073.

In the second ESZR series the console is not connected to the multiplex channel but rather is part of the central unit so their designation is different too, they are integrated consoles. The integrated console of the R-35 is the ESZ-1535 (Soviet) or the ESZ-1535-01 (Bulgarian) and that of the R-55 is the ESZ-7069 (GDR).

The structure of the consoles connected to the multiplex channel is: control unit, mechanics and power unit with power unit control. The control unit provides off-line operation and in on-line operation provides contact with the channel and code changes (generally DKOI-KOI-7 and back). The mechanics prints out the information or makes possible information input from the keyboard. The power unit provides the units with power and its control makes possible local or remote switching (from the central unit).

The writing mechanism can be letter arm (the ESZ-7070, 7073, 7074, 7077 and 1535), line (matrix) printer (the ESZ-7076) or turning disc (the ESZ-1535-01 and 7074-02).

The letter arm writing mechanism corresponds to a traditional electromechanical typewriter. The matrix printer mechanism forms the characters from points in a 5x7 or 7x7 matrix. In general, during writing the writing head prints one column of the matrix at one time. In the turning disc mechanism all the characters are placed on flexible languets on the edge of the disc. The writing mechanism turns the character to be printed in front of the single printing hammer which strikes the character. The consoles of GDR and Bulgarian manufacture make possible remote control of the central unit--loading the operational system (IPL process), stopping, starting, etc.

The "mechanics" of the integrated console of the R-55 (the ESZ-7069) is a display (a matrix printer provides hard-copy) and this makes possible a link between the operator and the operational system and between maintenance personnel and the computer. It includes the operating and indicating systems needed to carry out the foregoing tasks. A light pencil facilitates the work of the operator also. The ESZ-7069 is also connected to the multiplex channel.

The traditional, letter arm, mechanics has two faults; it is slow and it is very unreliable. Its small operational speed (10-15 characters per second), that is its slow writing, significantly reduces the efficiency of modern operational systems because these send many messages to the operator and wait for an answer.

Because of the complicated mechanics of letter arm typewriters mistakes are very frequent. This causes problems primarily with large data processing tasks requiring much machine time because an error at the console causes the system to stop and frequently the processing cannot be continued after the error is corrected but must be started over again.

As a result of the foregoing a number of Hungarian users have either switched to other types or use consoles developed domestically. For example, consoles using the letter arm mechanism have been replaced with ESZ-7074-02 and ESZ-7076 consoles. In several computer centers there have been successful experiments with the ORION ESZ-7061 alphanumeric display. The disadvantage of this solution is that separate hard-copy equipment is needed and this increases the price of the unit.

In the case of various "house" developments they have linked to the channel a somewhat more reliable typewriter (for example, the ASR 33 or the DATA DYNAMICS Mod 390) or a Videoton display or a matrix printer terminal (see the article titled "A Matrix Console on the SZAMKI ESZ-1022 Computer" in last month's issue) or a matrix printer supplied with a keyboard (see the articled titled "A Matrix Printer Console in the TITASZ Computer Center") using the control unit of the old console or control units they developed themselves.

| ESZ Type | 7070 | 7073 | 7074 | 7074-01 | 7074-02 | 7076 | 7077 | 1535 | 535-01 | 7069 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mechanism | letter arm | letter arm | letter arm | letter arm | turning disc | matrix printer | letter arm | letter arm | turning disc | display |
| Max writing speed (characters/sec) | 10 | 9.5 | 10 | 10 | 30 | 180 | 10 | 10 | 30 | x |
| Keyboard | mechan-ical | mechan-ical | mechan-ical | mechan-ical | reed relay | reed relay | mechan-ical | mechan-ical | reed relay | x |
| Character set | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Central unit control possi-bility | no | yes | yes | yes | yes | no | no | yes | yes | yes |
| Manufacturing country | USSR | GDR | Bulg. | Bulg. | Bulg. | Poland | USSR | USSR | Bulg. | GDR |

x -- no data

ACHIEVEMENTS IN INDUSTRIAL ELECTRONICS DEVELOPMENT

Sofia TEKHNICHESKO DELO in Bulgarian 26 Apr 80 p 14

[Report: The Promishlena Elektronika Plant in Gabrovo--A Pioneer in Production Electronics"]

[Text] The Promishlena Elektronika [Industrial Electronics] Plant in Gabrovo was the first plant in the country built for promoting the use of electronic equipment in industry. Displaying the persistence and inspiration of pioneers, its specialists found a market for their developments in virtually all national economic sectors. High frequency electronic equipment for induction and dielectric heating and ultrasound successfully resolve complex problems related to the introduction of new and effective technologies in machine building, precision casting, metal hammering and stamping, tempering and cleaning parts, new welding methods, and so on. In addition to all this, such technologies are characterized by a decisive increase in labor productivity, hygiene improvements, and drastic lowering of power intensiveness. Tens examples could be pointed out to prove that a single heating technology or electronic machine may save thousands of tons of liquid fuel.

The advantages of using electronics in industry are unquestionable. Today, when such problems have finally been properly assessed in terms of value and significance, this is particularly liked by the specialists at the plant, for most of their developments are focused precisely in this area and are meeting such requirements.

One of the new items is a tiristor transformer developing a 1,000 kw power, complete with a furnace and induction heating machines. One such set has been installed at the Surp i Chuk Hammer-Press Goods Plant in Stara Zagora, thus entirely changing its way of output. Also recently a system for induction heating of one of the metal-rolling machines at the electric hoist combine in Gabrovo was commissioned. This is the first time that such a machine has been produced in our country. In addition to foreign currency savings, the machine is saving the labor of a number of workers.

However, the plant specialists consider, perhaps, that their greatest success is the recent mastering of the production of most powerful tiristor PT 800 transformers which have an exceptionally high technical standard. They were developed together with scientific workers at the Higher Machine-Electrical Engineering Institute in Gabrovo and have a "K" state rating. This model was applied at the Tsentromet Plant in Vratsa with very good economic results, eliminating the need to import from capitalist countries. These transformers will soon be applied in a number of other plants throughout the country, mainly in improving metal smelting technologies.

Recently new tempering systems of the MZV2-1000 type were successfully developed along with the Mona-type machines for bulk heating, of a considerably more advanced design compared with familiar models. Their good qualities have created an interest abroad as well, and export requests have been received.

However, one should not be left with the impression that the developments and items produced by the plant are focused almost exclusively on machine building and metal processing. They are being applied in all areas--food and light industry, chemistry, metallurgy, and consumer goods.

For consumer purposes especially the plant developed a series of systems for plastic material welding which laid the foundations of a new domestic industry--the production of plastic goods. It is perhaps in terms of this indicator and level of saturation with such machines that Bulgaria holds one of the leading positions in the world and tht the plant has been internationally recognized as the biggest producer and exporter within CEMA. This high rating creates obligations, for which reason the production of new such systems has already been mastered: UZP-1600, UZP-3200, and UZP-6002. The last model was jointly developed with specialists from the Leningrad institute. It has improved operational qualities, greater reliability, and reduced metal and labor intensiveness in its manufacturing.

The wide area for the application of electronics in industry has encouraged the plant specialists to focus on strategic topics in this area, mastering new items and, above all, developing comprehensive technological lines. This applies, above all, to a range of electric starters for asynchronous electric motors, special sources for electric welding, and expanded traditional areas of plant output--installations for induction heating and dielectric heating, and ultrasound equipment.

These classical areas of the application of electronics will remain basic. However, they will be modernized and intellectualized. At the present extensive work is being done to develop microprocessor equipment and in the near future 30 percent of such developments will have microprocessor control. The main purpose is for the plant to make its contribution to developing industrial electronics and upgrading production effectiveness. This will save the national economy millions of leva.

# DEVELOPMENT OF COMPUTER SOFTWARE ADVOCATED

Sofia TEKHNICHESKO DELO in Bulgarian 19 Apr 80 p 4

[Article by Veselin Spiridonov, deputy director of the Interprograma Bulgarian-Soviet Institute: "The Software Industry"]

[Text] At the dawn of the development of computer equipment no one could even consider the fact that the price of a computer system is determined entirely by the cost of the equipment. This state of affairs reflected merely the inertia of the mind, as mankind was unable to immediately realize the qualitative leap offered by computer technology. However, the trend which has even further enhanced the importance of programming began to impose itself gradually and steadily. A time came when the balance was achieved--several folders with program products now cost as much as the technical facilities within the computer system. The balance continues to lean that way....

Bulgaria became one of the leading countries in the world in the production of computer equipment. The parallel activities of program support began to develop quite naturally. Today the task on the agenda is to organize the production of software on the level of a highly effective economic activity. Our country, therefore, laid the foundations of the software industry: The interprogram Bulgarian-Soviet Institute has been operating for the past 3 years.

An obvious disproportion exists in a number of countries throughout the world between the possibilities of the technical facilities of computers and the status of their mathematical support. That is why a basic trend is developing in this area: organizing the production of programs and entire program-technical systems on the level of highly effective economic activities. As a result of this, over the past decade mathematical support has developed at an exceptionally high pace. The ratio between outlays for mathematical support (software) and expenditures for technical means (hardware) in the control systems has changed in favor of software. In a number of countries it has reached a three-to-one ratio and is continuing to grow.

Several million people throughout the world are directly engaged in programming in scientific institutes, organizations, industry, services, hardware manufacturing companies, and specialized software organizations. The attitude toward computer programming has changed as well. Until now it was considered a science, an art, or a craft. Now it is approached also as an activity which could be organized in accordance with the requirements of industrial output. The acute hunger for programs throughout the world, the shortage of adequately skilled programmers, and the expected effect of the application of program-technical systems by the consumers represent the base on which the new national economic sector was developed: the software industry.

The consideration of programs as a commodity is the economic base of the software industry. For a long time software was a supplement to computers, offered free of charge, and, even though it influenced the price-setting of the machines and their advertising, it was not considered separately from the economic viewpoint. Over the past decades, in a number of countries it was separated from the machines and became a separate production and trade item. However, this has still not been entirely achieved in our country. A number of organizations and firms were set up mainly engaged in the production, trade in, and consulting in the utilization of programs. The program products, already exceeding 5,000, are being advertised and assessed regularly and published in special periodical collections. It became clear that the commercial success of or another program product depends mainly on sales. Program products become rapidly obsolete. They require follow-up and consultation aid to the consumers and need constant modifications based on market requirements. In a number of developed capitalist countries the manufacturing of software and of entire program-technical systems has become a highly effective economic activity, a separate industry with its effective organization with specialized standards and st ict technological programming discipline. Programmers are given access to technical and program means for automating programming. Legal and economic foundations have been laid for the production of and trade in the new commodity: program products and program-technical systems. A wide network of companies and units for their production and trade has been developed. The effectiveness of program products and systems is insured through specialized organizations providing consultations and services.

The software industry demanded the industrial organization of labor in the institutes and firms providing mathematical support. Independent mathematical plants are being built with their specific forms of organization of programming collectives: functional, design, and matrix. The tasks and functions of every specialist within the programming collective are being regulated. Standards are being applied for documentation and better substantiated norms for the work of programmers. Technical and programming facilities are being provided

for the automation of programming. The industrialization of software production is substantially changing the work style of the programmers along with some basic assessments. The low cost of the produced program goods becomes particularly important, leaving the other factors in the background. On the other hand, the introduction of structural programming, for example, has met with the opposition of a number of talented programmers who believe that this is narrowing their possibilities. Under these circumstances, a compromise is being sought between programming as a science and art and programming as industrial activity.

In our country programming has been developing for the past 20 years. However, the software industry is merely at its beginning. That is why the principles governing its organization are particularly important.

In order to achieve the fast development of the software and high effectiveness within a short time, the software industry must be organized on an economic basis and follow the general principles governing the organization and management of material output. At the same time, the specific nature of the production of software and of the group of activities related to its utilization demand certain specific indicators for the assessment of the results of such activities. To this purpose it is necessary to develop and approve detailed indicators. Along with other measures and conditions, all interrelated activities determining the development of an entirely new sector in our country must be created or developed further. This new sector will study trends in the development of software support and program-technical facilities in our country and abroad, and will engage in corresponding marketing activities (advertising-commercial activities for supplying and selling in our country and abroad program products and program-technical systems). The development of software and the application of program-technical systems will be concentrated in this sector and the available domestic mathematical support and its dissemination among consumers will be studied. Furthermore, we must organize the follow-up, support, and improvement of mathematical backing and consulting activities related to its utilization and application.

The problem of cadre training must be definitely resolved. They will develop and use software and apply program-technical systems.

Cadres who can work in the field of software are being trained in several higher educational institutions and postgraduate training establishments. Unfortunately, the only institution which trains ready specialists, possessing the necessary knowledge meeting modern requirements, to be used immediately by the software organizations, is the Unified Center for Mathematics and Mechanics of the Bulgarian Academy of Sciences. However, there are few such cadres, not exceeding about 20 to 30 people annually.

We have a somewhat greater number of cadres who could use the already developed software.

The industrialization of software also requires the skillful application of industrial work methods in the organizations themselves. In this respect the most necessary measures are the following:

- insuring technical and program facilities for the automation of programming, drastically upgrading the labor productivity of the programmers;

- utilization of contemporary technologies and programming methods;

- developing and utilizing standards and other normative documents, and standardizing programs and technical developments thus yielding maximum multiplication results.

These are the basic problems to be resolved in order to organize the development and utilization of software in our country and develop our software industry on an industrial basis.

3003
CSO: 2202

PRODUCTION, DEVELOPMENT OF PHOTOGRAPHIC PAPER

Sofia TEKHNICHESKO DELO in Bulgarian 26 Apr 80 p 4

[Article by Kalina Purvanova: "The Inventors of the Pokhar BRV [Development and Application Base "]

[Text] The modern production of photographic paper in Bulgaria began in 1972, following the commissioning of the Pokhar plant for photochemical products. Its development and application base makes it possible to closely link science with practice. The most characteristic feature of the scientific research activities of the base is that it rapidly responds to production requirements. It is engaged in the development of technologies for a broad variety of photographic paper, upgrading its quality, standardizing photochemical products, and advancing and introducing new methods for controlling raw materials, semifinished products, and finished goods. As a result of the study of the processes of spectral and gold sensitizing and stabilization with a variety of organic substances of nondeveloped silver chlorine photographic emulsions, various types of photographic paper have been developed for projection and contact printing with various tones for the developing of photographed images. The specialists have seven authorship certificates for the technologies they have developed.

For over 15 years the Pokhar BRV has engaged in extensive scientific research in accordance with the development of photochemistry in Bulgaria and industrial requirements. Headed by Professor Engineer Evdokiya Ozhereleva, specialist-inventors are engaged here in adamant scientific research. For example, scientific associates T. Sotirova, Khr. Yarukova, L. Mandadzhieva, and R. Beloslatinska, and engineers Y. Dalukov, N. Zhelyazova, and St. Mikhaylova are excellent experimentation workers.

Whereas compared with the beginning of the production of photographic paper in our country, by 1971 the volume of output had increased by a factor of 18, in 1980 the volume of output will be increased by a factor of 200 compared with 1956. The use of silver and gelatin has been

reduced by 30-50 percent compared with the average global practice. The photographic paper produced has high indicators of maximum optical density, good resistance to filming in development, and is good for two years. In addition to their very good quality, the Pokhar emulsions also have a very short time of synthesis--80-90 minutes, compared with 3 to 8 hours in other countries.

The high quality indicators of Bulgarian photography papers have earned the plant a number of distinctions. In 1968 Eksfo and Novofo were awarded gold medals. In 1970 a gold medal was awarded to Potretfo while photographic paper for industrial documentaries was awarded the gold medal in 1971. In 1970 an honorable diploma was awarded to all the varieties of Bulgarian photographic paper at the international chemical exposition in Moscow. In 1978 the Isofo photographic paper was awarded the gold medal at the International Plovdiv Fair. It was also rated as high-quality category "K."

According to Prof E. Ozhereleva the secret of these successes is found, above all, in the profound study of global achievements and production requirements, experimenting, and fast utilizatin of new developments. It is no accident that here the high value put on individual cadre skills is the law. As early as 1960 engineers and technicians hired by Pokhar were asked to take tests on sensitometry and theory of photographic processes given by a commission of highly skilled specialists. However, this did not end the training of the new personnel. The process of the intensification of knowledge is continuing throughout their career.

What kind of reciprocal relations are maintained between the Pokhar plant and the BRV and related institutes and enterprises in the socialist countries?

Professor Ozhereleva answered the question as follows: "For several years we have been working together with the USSR (Gosnilkhimfotoproyekt). A plan was formulated for joint scientific research for the Seventh Five-Year Plan. In the past three years we have closely cooperated with the USSR in the production of photographic paper. We are also cooperating with the GDR on the acquisition of high-quality barite photographic paper lining."

Something else as well predetermines the successes of these inventors. Their work is a structural component of the plant's program and, as they pointed out, they have no "pauses" between the development and the application of an invention. They know what industry needs and how best to resolve this in practice. The last invention--the Isofo photographic paper, for example--was tested and applied at the plant even before receiving the authorship certificate issued by the Institute of Intentions and Rationalizations. Here the application of inventions is smooth and no fighting for it is necessary.

Naturally, the question of the future arises. What are tomorrow's plans of this collective of daring creative workers?

A great deal of work remains to be done on new products and color photographic paper whose production will be undertaken in 1981, the intensification of machine productivity without lowering the quality of the products, the development of black-and-white and color movie positive films, and the development of Polaroid systems.

The economic effect of the production of photographic papers is tremendous. A total of 4,500 kilograms of silver nitrite have been saved. The varied and rich (exceptionally warm) tonality and its high qualities make Bulgarian photographic paper sought with equal interest in the USSR, India, Pakistan, Turkey, Saudia Arabia, Afghanistan, Belgium, and many other countries. These are results representing the efforts, energy, minds, and hearts of the Pokhar inventors.

5003
CSO: 2202

## BRIEFS

FOREST DAMAGE--An unusually high occurence of tetrix moth has been detected in the forested areas of Jizerske hory, western part of Krkonose and Horni Blatna in Krusne hory. The CSSR Ministry of Forestry and Water Management has launched intensive preparations to exterminate this pest by aerial application of pesticides. Slovair Bratislava will make available all of its resources in this effort. Between 1 June and 15 July 1980, the affected forests will be posted with signs "Entry to the forest is prohibited." The steps are necessary notwithstanding the fact that the aerial application will take place during the peak of the tourist season. Otherwise the damage done to the spruce forests both by the air pollution and the tetrix moth could have unforeseen consequences. [Brno ROVNOST in Czech 8 May 80 p 3]

CSO: 2402

# DIRECTOR OF ROBOTRON INTERVIEWED ON REORGANIZATION, PLANS

Budapest SZAMITASTECHNIKA in Hungarian Apr 80 pp 2-3

[Interview with Professor Dr Wolfgang Sieber, director general of the Robotron Combine, by Dr Ivan Szabo]

[Text] Delivery of Hungary of the ESZ-1055 [ESZ, Uniform Computer Technology] systems manufactured by the industry of the GDR is an increasingly timely subject. Parallel with this there has been a multiplication of those unclarified professional, commercial, configurational and other questions which increasingly obstruct the preparatory work, ensuring receptivity and system planning, of conscientious users. The already approved ESZ-1055 system was again exhibited by Robotron at the Leipzig Spring Fair. Since changes can be found in the configuration as compared to what was shown earlier it is not without interest to list the units of the system: an ESZ-2655 central unit with 1 Mbytes of central storage, one ESZ-6920 console with screen, one ESZ-7031 line printer, one ESZ-5517 magnetic tape control unit, three ESZ-5017-2 magnetic tape drive units, one ESZ-5567 disc control unit of Bulgarian manufacture, one associated Bulgarian ESZ-5567 control module and two Bulgarian 2x100 Mbyte twin drive exchangeable disc drive units model ESZ-5066-E, one two track ESZ-5075 floppy reader device and one ESZ-6019 punch card reader. An ESZR OS 6.1 operational system was run on the system; this was developed for the second series of ESZR equipment and it contains SVS, BTAM and TCAM components.

Our colleague took this occasion to get answers to some of the questions of Hungarian users in the course of conversations with leaders of the Robotron Combine, primarily Professor Dr Wolfgang Sieber, the director general, Dr Frank Seiffert, deputy director of the commercial enterprise, and Manfred Pieles, chief of the Budapest office of Robotron.

We hope that the questions and answers connected with large systems and the supplementary data recording and data processing equipment, the so-called "application lines" (the computer technology hardware and software tools of complex sub-systems), will offer useful information for the many interested readers.

[Question] What effects can we feel already from the reorganization and large scale centralization of the Robotron Combine, especially from the viewpoints of the realization of the so-called "application lines" conception, delivery possibilities for large complex systems and improving the efficiency of R and D activity?

[Answer] We have taken important centralization measures in recent years, based on the already existing nucleus of the Robotron Combine. What is involved primarily and before all else is that we have supplemented the existing orientation of the Robotron Combine, its medium category electronic data processing equipment and small computers, with a department for small data processing machines and in regard to peripherals. This centralization process laid the foundations for a system conception for "technical tools for decentralized data processing." In accordance with this sytem conception we had to realize the following "application lines": automatic devices for bookkeeping, invoicing and accounting; data recording, data preparation and data conversion systems; small data processing systems; text recording and text processing systems; and data processing systems for technological processes. The devices named can be used alone or in TAF [remote data processing] systems. The formulation of the technical tool system for decentralized data processing was preceded by a comprehensive market analysis so that the user systems should be characterized by good applications properties and so that the possibilities of the combine could be used to a maximum degree, namely in such a way that every plant should manufacture definite universal assemblies which could be used later in the most various finished products and every plant should assemble one or more parts of the above mentioned application lines. In addition, the plant involved is responsible for the development of all those properties of the finished product which are necessary in addition to the properties characterizing the universal assemblies.

Very rational manufacture was realized in regard to many types of finished products in accordance with this principle. As a result of the universal assembly groups various plants manufacture micro-computers, display units, writing devices and other peripherals, power supply modules and the housing elements needed for the finished products. The most important parts of this modular conception were displayed at the Leipzig Spring Fair within the framework of the sub-exhibit "technical tools for decentralized data processing." These were:

--the Robotron K 8931 reservation terminal for rail and airline tickets and hotel room reservations,

--the Robotron A 5201 data recording equipment and the Robotron A 5203 data recording terminal for recording measured data, checking and correcting the data recorded, transfer to a data carrier and data transmission,

--the Robotron A 5101 and 5103 automatic devices for bookkeeping, invoicing and accounting, and

--the Robotron 6401 small data processing equipment for scientific-technical or commercial data processing in a real time or batched operational mode.

[Question] In addition to the manufacture of equipment and software suitable for large computer TAF networks does the Robotron Combine plan the manufacture of decentralized systems based on mini-computers, especially in regard to shared intelligence user systems or information services based on homogeneous and logical interdependencies of enterprise organizational units at similar levels?

[Answer] I have already noted that the tools for decentralized data processing also include terminals. It would be more precise for me to say, however, that all the equipment can operate as subscriber points in TAF systems, whether the equipment be reservation terminals, data recording equipment, automatic devices for bookkeeping, invoicing or accounting, or small data processing equipment. This is how the conception of the Robotron Combine TAF system is developing, making use of those ESZR central TAF computers, multiplexors, concentrators and terminals (subscriber points) which are available within the framework of the ESZR or MSZR [Uniform Computer Technology System or Mini-Computer System] and which are being developed as part of the combined developmental program. TAF [remote data processing] is realized with these components via a general use of micro-computers, building up shared intelligence systems and information services which always process the data at the most suitable location.

[Question] Does the Robotron Combine plan the manufacture of "point of sale" equipment for a special category of users, that is for the automation of the conventional activity of those dealing with clients and for the processing of non-textual information? When will such equipment appear in the product profile of Robotron?

[Answer] The user systems planned by the Robotron Combine embrace a broad veriety of equipment. Nevertheless it is not always possible to complete such systems, those mentioned in your question, on our own. For example, we plan to develop electronic cashier systems using the products of the Robotron Combine and of other socialist countries.

The Robotron Combine is now preparing to manufacture other numeric recording systems, especially for theproduction sphere. This area also offers comprehensive manufacturing and applications tasks and complex cooperation possibilities to the socialist countries.

[Question] The efficiency and productivity of programming and system design activity are someof themost important criteria and conditions for the realization of the computer technology applications development

policy of every country. What does the Robotron Combine intend to do in the interest of developing and delivering new software products so that they--for example, the communications software for the TAF systems--will be available for the users of the 1055 in 1981 and so that the lack of them will not cause new software acquisition problems for the customers?

What is the conception of the TAF systems developed by Robotron (program development, the handling of textual and numeric data, the situation of front-end computers, special purpose TAF systems, the variety of terminals and multiplexors) and what are the chief hardware and software elements thereof? How do you imagine the realization of these components in the systems being offered by Robotron? What rate of realization can be expected?

[Answer] To an ever increasing extent the efficient utilization of our computers is determined by software development, which in turn depends to a large degree on the number of our programmers and on the efficiency of their activity. Robotron also is conducting a deliverate analysis of these problems for the purpose of developing problem oriented software technologies. We want to provide the users of our computers--and this includes the small computer systems too-with aids to simplify and facilitate programming work. As for the TAF software for the ESZ-1055, the Robotron Combine is working in this area also according to a so-called phased program. This phased program began with the first ESZR series and naturally it is continuing with the second ESZR series. Since in this case a comprehensive program is involved we cannot designate individual system elements or points in time.

Naturally this is possible at appropriate working levels. The prescriptions of the authorized international bodies are valid for these programs just as they are for the device components.

[Question] A more extensive utilization of TAF systems in Hungary is a stressed task for the 1981-1985 plan period. The 1055 systems could be important tools for realization of this, including the 100 Mbyte capacity disc units which are parts of these systems and very important prerequisites for efficient TAF processing. How do you judge the delivery possibilities for large discs and disc control units? Can we expect your systems to be delivered in 1981 with large discs? Who might the manufacturers of the large discs and disc control units be?

[Answer] As you know yourself the Bulgarian People's Republic and the Soviet Union have specialized in the manufacture of large capacity discs. We will equip our systems with large capacity exchangeable disc units in accordance with the manufacturing and delivery possibilities of these countries.

[Question] When establishing computer networks, what international standards and norms do you regard as authoritative (ESZR and other systems)?

[Answer] The debates in this question have not yet been concluded within the framework of the ESZR. We are active participants in these debates. Ultimately the agreements which are concluded are obligatory because the development of large TAF systems is possible only by using all the CEMA equipment and software components available and this requires a uniform conception binding on all. But the present status of the agreements does not impede the energetic realization of our own conceptions.

[Question] Could you name those users inside the GDR who are already using 1055 systems! What capacity discs and what sort of TAF systems are used in these configurations?

[Answer] We have been manufacturing the ESZ-1055 computer system since the second half of 1979 and so relatively few domestic users have such equipment. It should be emphasized, however, that we can also build up TAF systems with the ESZ-1040 systems. Since TAF systems have been operating for a rather long time the experiences gathered with the use of the preceding systems are very valuable. In the GDR the state railroads of the GDR and the state bank of the GDR are now preparing to use larger TAF systems. Although the computer receptivity preparations of these users are adequate they do not yet have ESZ-1055 systems.

[Question] As a result of the worldwide acceleration and use of circuit integration how will the cost/performance index of the 1055 develop as compared to the 1040 system or to the members of the second ESZR series? Does this technological revolution have an effect on reliability, repairability and a reduction in the supply of spare parts? How do you judge in this respect the present developmental level of peripherals which can be delivered and connected to CPU's?

[Answer] It is obvious that the area in which a computer is used at any given time also determines the performance parameter so one must certainly consider what special properties of a computer are especially needed for a given application. If we are to compare the ESZ-1040 and the ESZ-1055 we must compare a large number of indexes. Let us only think of the fact that the ESZ-2655 central unit has a whole series of high level use characteristics! To mention only a few of these, it has greater central storage capacity, the possibility of using virtual storage, a new console and comprehensive diagnostic possibilities, and the central unit is of smaller volume. With regard to all factors we can say that the performance capacity of the ESZ-2655 is 50 percent greater than that of the ESZ-2640 central unit.

The price development of the international computer market is well known. It is the expressed principle of the Robotron Combine to take the larger capacity into consideration in accordance with the price formation principles of CEMA. These principles, as is well known, pay attention to developments on the world market. Reliability and all the questions connected with this can be attributed not only to the developmental level of circuit integration. The development and manufacture of the

of more than 300 ESZ-2640's. For example, the many test and diagnostic programs can be run from the console in the autonomous mode and under an operational system.

The technical down-time index of our systems is well over 90 percent. On this basis the quantity of parts for the ESZ-2655 can be reduced to 60 percent as compared to the ESZ-1040.

It is surely well known that not only is the equipment itself smaller but so is the power requirement of the ESZ-2655, which means that it is only 40 percent that of the ESZ-2640. This is not only a question of saving energy; as a result of this the air conditioning expenditure required for the computer decreases also.

[Question] What technical changes and new equipment can the Hungarian market count on in the 1981-1985 plan period in the area of data recording and primary data processing? Does Robotron plan to manufacture converters similar to magnetic tape cassette converters which can convert the contents of floppy discs to computer compatible magnetic tape?

[Answer] On the basis of our exhibit in hall 15 of the fair you had the opportunity to get a comprehensive picture of the level of our improved products. The characteristics of this are a uniform technical base based on a micro-computer, the compatibility and standardization of data carriers, programability at various levels and a uniform construction design. Our modular manufacturing program corresponds to the goal of achieving a maximum of user oriented solutions with a minimum of equipment and main assembly groups. This is the Robotron conception in the areas of recording, storage, transmission, processing and making data available and we realized this by using the equipment, equipment groups and user solutions involved with micro-computers developed by the Robotron Combine. The Hungarian People's Republic is one of our significant partners in this area. Obviously we will offer our modern technology to Hungarian users also. In 1981 we will take concrete measures to prepare for the market introduction of the equipment in the Hungarian People's Republic. On the basis of the technical and user technique level of our devices for decentralized data processing and on the basis of the many years of strong contact between our countries I am convinced that our product program will become an important part of the deliveries in the 1981-1985 plan period and will be usefully employed in the Hungarian national economy. I mentioned earlier the conception for the technical devices for decentralized data processing and I named the equipment exhibited at the Leipzig Spring Fair. Naturally we are also preparing to manufacture other earlier equipment in the area of data recording but I would like to mention now only one new device, the optical character reader. We are offering all this equipment and naturally it is available in the Hungarian market in the 1981-1985 plan period.

[Question] The narrow cross-section of software development and programming capacity is a world-wide problem. How is this reflected in the 1980 offerings for equipment manufactured by Robotron-especially in regard to machine oriented and user program packages for the 1055--in documentation and in the operation of the software service?

As a large scale software manufacturer (if I may use this term) what sort of user program packages can the Robotron Combine offer to Hungarian users of the 1055 and will it undertake, and if so in what way, the high level of initial aid needed to adapt, apply and introduce the program packages and the other activities judged necessary?

[Answer] I do not want to give a full listing of products prepared or offered in 1980. As an overview, however, I can name the following complexes: machine software (MOS), an up-to-date version of the ESZR OS 6.1 operating system (basic program package andsupplements) and a version of the ESZR DOS 1.7.3.

User software (POS) includes the DBS/R data base management system and a broad scale of problem oriented softwares. Software delivery includes documentation, the data carrier and an offer of initial aid. Naturally, until a new software version is issued we provide maintenance of the current software versions. We cooperate closely with the big users in Hungary and with the organs of the NOTO-OSZV [OSZV, National Computer Technology Enterprise] in regard to applications of Robotron software and this is useful to and supports other Hungarian users.

[Question] Comrade Pieles, as chief of the Budapest office you are well acquainted with the situation of computer technology applications in Hungary, the market requirements, the sensitivity of the market, the customer service still caring for the machines and the situation in parts supply and software services. As the shipper in the preparatory phase of marketing the 1055 in Hungary, what new services are you undertaking and what new requirement system will you pose for your contract partners?

[Answer] In regard to market work we are concentrating our forces, in conjunction with NOTO-OSZV, on those large users who can guarantee the economical use of our new equipment. Naturally the balance of our work in this area is on hardware and the questions closely connected with this and on the user program packages. For example, railroad and hotel reservation systems, money management, manufacturing control in the metal processing industry, shipping control for chemical industry enterprises, energy distribution and the control of power plants.

On the basis of several years of experience we want to improve customer service and parts supply, but we expect from our partners a strengthening of their maintenance activity with more modern measurement and testing instruments, for this could improve the technical down-time index of our equipment.

Robotron continues to consider it important to strengthen contact with NOTO-OSZV as a marketing and customer service organ. As a result we seriously expect NOTO-OSZV to provide independently installation and replacement services and activity connected with generating the operational system for in this way the NOTO-OSZV will come ever closer to the guiding principles of the RSZR, according to which the NOTO ortans must becomecomplex organs for marketing and customer service activity in the given country.

8984
CSO: 2502

VIDEOTON TO PRODUCE THE SZM 52/10 COMPUTER SYSTEM

Budapest SZAMITASTECHNIKA in Hungarian Apr 80 p 4

[Article by Janos Gantner: "The SZM 52/10 Compter System"]

[Text] The experiences acquired in the course of the successful development of the first phase of the Mini-Computer Systems (MSZR) program and as a result of the successful use of the first series of computers manufactured a demand has arisen in the most varied applications areas of the national economies of the socialist countries to develop as one of the first tasks in the developmental program of the second MSZR series large capacity mini-computers with hierarchic control suitable for automation systems.

The joint long range research work (TKM) being conducted in the ESZR [Uniform Computer Technology System] and the MSZR also prescribes the development of uniform and flexible, multi-purpose computer designs, the application of new principles and more efficient use of mathematical tools.

Taking into consideration these viewpoints and on the basis of the experiences of the ESZR small computer program of Videoton--and relying on international developmental cooperation--it was decided to develop the SZM 52/10 model of the SZM 52 computer category.

The Characteristics of the SZM 52/10

The SZM 52/10 has a flexible design so it can be simply configured to adapt to the task to be solved.

The system is capable of using applications programs developed earlier while in the so-called native (natural) operational mode it provides the advantages offered by flexible design and programming.

We sought to realize three things in working out the design--modularity (for both hardware and software), microprogramming, and bus systems. The chief viewpoints for developing the architecture were:

--optimal division of tasks between hardware and software,

--support for a multifunctional operational mode with hardware and firmware tools,

--mutual protection of user and system programs while providing for good communication between them,

--the ability to use mathematical tools worked out earlier, and

--the realization of developed self-diagnosis.

Realizing these viewpoints made it possible to run various programs on the same machine simultaneously. (Up to now this property has been a characteristic only of large computers.)

The advantages offered by the ECL, TTL and MOS LSI technologies used made it possible to divide up the central storage (also not customary in minicomputers up to now). At the same time, floating decimal or decimal operations are performed with decentralized operation executers and some file management functions, for example, are supported by firmware in the coupling units (sometimes 2-10 Kbytes). We completely did away with the customary, complicated console and developed methods for remote program loading and remote diagnostics. (The latter also means a qualitative change in technical servicing.)

Primarily to satisfy transaction and mini-data-base management needs the model has a maximum 1 Mbyte operational memory and a background memory expandable to 200 Mbytes. A so-called cache (accelerator, buffer) memory makes possible use corresponding to the speed of the processor by adjusting the transmission speed between the memory and other system elements. Control of the terminals or their link into the network takes place through synchronous or asynchronous lines. The model has a multiple level (64) switching system. Instructions are in word format (16 bits) and data can be in half-word (byte), word (16 bit), or double word (32 bit) floating decimal format. Microprogram storage is realized in loadable (RAM) form, part of which is reserved for so-called user control store functions. Microdiagnostics constitutes a part of the central unit and tests the processor and the cache memory. Diagnosis can be done at any placement of voltage (but can also be done from the operator's console).

Architecture

The central unit is built up of the following standard modules: interface; cache memory, arithmetic and logic unit; and timing logic unit.

In addition to the memory or peripheral bus the processor has a synchronous bus to carry out fast internal communication, for communications within the CPU modules or between the CPU and the large capacity operation executers.

The cache memory actually constitutes a "speed interface" between the relatively slow operational memory and the fast arithmetic and logic unit built with an ECL microprocessor. The capacity of the cache memory is 8 Kwords. All "input" in the cache is organized in the form of word pairs. On each reference to it, access to the memory takes place with the less significant bits of the paired address.

If the word sought is in the cache memory there is no communication with the operational memory and this significantly accelerates the memory reference operation execution times. (With good access 90-95 percent of the operations which use memory can be executed in the cache cycle time, that is with a cycle time of about 250 nanoseconds.)

The logic unit is built on a "bit slice" microprocessor. It contains a real counting unit and the bit fields of microprogram storage belonging to control. The timing logic unit performs micro-instruction addressing, decoding of instructions and the management of memory segmentation. The microprogram storage is loadable and a microprocessor performs the actualization of it on each occasion. The control microprocessor reads in the basic microprograms from a "read only" storage to create the initial conditions. The other microprograms needed can be read in from operational memory.

The operation executers serve to increase the efficiency of FORTRAN (floating decimal) and COBOL (decimal) operations. They constitute an independent optional unit and make possible the implementation of instructions oriented toward high level languages. The efficiency of various translation programs can be increased significantly with the building in of such special arithmetics. A second processor formed with firmware techniques from the basic modules performs emulation. (Theoretically it is possible to multiply the emulator processors in order to realize other instructions.) The high level technology used ensures that the instruction execution times characteristic of the emulated arthitecture are no worse than those of the original models.

The microprocessor coupling units used in the case of larger capacity peripherals significantly reduces the burden on the processor. These actually contain a processor with degraded characteristics developed for functional transmission control and a linking unit for direct memory access. These processors carry out the organization and control of the data flow characteristic of the peripheral in an autonomous operational mode. (In accordance with the modular principle the I/O processors generally differ only in the firmware tools.) The intelligent coupling units perform a number of new data transmission networks (for example, synchronous asynchronous and X interfaces in accordance with the ISO standard).

The decentralized hardware functions greatly aid the optimal development of software with favorable price/performance indexes and manufacturer/user cost indexes. The model contains integrated, high performance

peripheral controls but also makes possible the attachment of peripherals using a simple, standard bus system.

Taking into consideration the goal of standardization, the possible peripherals include ESZR and MSZR peripherals in accordance with current performance and economy viewpoints.

In the interest of humanization and making the man-machine link efficient one should use the most modern microprocessor controlled line printers and displays available

This equipment has been prepared paying maximum attention to the ergonomic requirements of operating and assigning organs.

Conclusions and Tasks

The conception of the SZM 52/10 and the scheduling of its introduction will make possible the wide-scale use of a very early member of the second MSZR series in the second third of the sixth 5-year plan to solve tasks which differ from the average and which pose special requirements. We regard it as an extraordinarily important task to prepare the users very early for a suitable reception of a high performance mini-computer. Experiences at this time warn us that in general the quality of user preparation determines the possibilities in the several models. Thus, when developing the model we tried to relieve the users of a series of routine operational tasks so that they could turn their capacities and energies to the solution of higher level organizational tasks.

8984
CSO: 2502

HUNGARY TO RECEIVE SM 4 COMPUTERS

Budapest SZAMITASTECHNIKA in Hungarian Apr 80 pp 4-5

[Interview with Gabor Reich, a main department chief in the NOTO-OSZV, by Gyorgy Csanyi]

[Text] Our editors were recently invited to a program connected with MSZR [Mini-Computer Systems] equipment organized by the Hardware Section of the ESZR [Uniform Computer Technology System] Users Club. After we heard the lecture titled "Chief Characteristics of the SM 4 Mini-Computer", lecture which elicited great attention, we used the occasion to talk with Gabor Reich, a main department chief in the NOTO National Computer Technology Enterprise (OSZV), about questions pertaining to the MSZR machines, questions which interest many.

[Question] Several socialist countries introduced their first and second series MSZR systems at the ESZR, MSZR jubilee exhibit held in Moscow last year. Which ones of these figure in the import plans of the OSZV?

[Answer] There really were a number of MSZR machines at the exhibit but those in the second series were primarily developmental models. Of the first series machines we decided, taking into consideration the degree of manufacturing preparedness at the time, to import the SM 4 computer of Soviet manufacture. Our decision was also influenced by the fact that the architecture and instruction system of the SM 4 made it possible for us to use the experiences connected with the PDP 11 and other similar machines used by us since 1976.

[Question] Are such computers working in Hungary already?

[Answer] Yes. An SM 3 and an SM 4 arrived in 1979. Both are operating in the technical department of our enterprise. Our purpose in importing these machines was partly to prepare adequately the specialists of the enterprise to carry out the complex tasks connected with the MSZR program. In addition, we have the important task of measuring the degree of compatibility between the SM 4 and the PDP 11/40. I might say that the initial experiences acquired in this area are reassuring.

[Question] What justifies the decision not to import more SM 3's?

[Answer] The price of the central units of the two computer systems differ from one another to only a small degree but the capacity and structure of the SM 4 substantially surpass the other. So in the future, as I have said, we want to deal with the marketing of the SM 4.

[Question] Does this mean that you are not planning to import other types of machines?

[Answer] No. If another type of machine, for example the SM 2, is needed as an element in some technical process then we will get it.

[Question] You just mentioned the price of the central units. In our present difficult economic circumstances this is not an indifferent question. What information can we give those who want to buy the SM 4?

[Answer] As a result of our price talks with the Soviet partner the price of a smaller system--with 65 Kbytes of operational storage and 4.8 Mbytes of background storage--will be about 2.5 million forints. The acquisition price of a larger system--with 128 Kbytes of operational storage and 20 Mbytes of background storage and a more ample selection of peripherals--will be about 6 million forints.

[Question] At these prices, how many SM 4's could find owners by the end of the year?

[Answer] We expect 10 systems to reach the country by the end of 1980.

[Question] Who will the first purchasers be?

[Answer] Our first users include the MMG [Measuring Instruments Factory], the April 4 Machine Industry Works, the Kaba Sugar Factory and the Danube Iron Works.

[Question] If you receive more orders how long will it take you to satisfy their needs?

[Answer] We are undertaking to deliver the SM 4 within 6 to 18 months, as a function of the needs of the user. In any given case the delivery time could be shorter than this. I can say that in the second half of 1980 we could have a few medium size systems available for newly appearing users.

[Question] Who might these users be, that is, to whom are you offering the SM 4?

[Answer] Primarily these are for data processing tasks of small and medium size enterprises, for technical-scientific calculations of research

and development institutes, for measurement and data collection purposes and sometimes for technological control and educational purposes. Later we want to make possible the development of TAF [remote data processing] networks with MSZR and ESZR-MSZR bases.

[Question] What ideas do you have for satisfying the process control need, how does this fit into the present profile of the NOTO-OSZV?

[Answer] We consider process control to be a very complex task requiring great experience and intellectual capacity. In satisfying user needs we want to work closely with the KFMI [Central Research Institute of Physics] and VIIATI [Institute of Electrical Automation] and where necessary we would like to build on the experiences of SZAMKI [Computer Technology Research Institute].

[Question] How are you helping users to get acquainted with the MSZR machines? Have you done market research?

[Answer] In the course of our preparations we did wide-scale market research. On the basis of these experiences we are seeking out potential customers, holding technical-commercial consultations with them, preparing written information materials for them and making it possible for them to see the computers we have in operation. We are seeking ways to demonstrate the MSZR on an even broader scale and this includes the possibilities of using the SM 4.

[Question] Even for the ESZR machines program supply is one of the most important questions. How is this developing with the MSZR? What sort of user (factory) program packages do you deliver with the several systems?

[Answer] We regard it as a fundamental task to provide our users with modern operational systems together with the computers. In addition, we consider it necessary to provide method oriented program packages for the given user areas, which will make it possible for the users to prepare their own programs with relatively little intellectual expenditure.

[Question] Do you give the customer help in the beginning, with special regard to fitting user program packages to the systems and putting the systems into use?

[Answer] The modular structure of our instruction system makes it possible for our users with less experience to prepare for the more basic programming. In addition, we want to offer our users programming and organizational aid in the interest of efficient use. In this work we would like to rely, in addition to our own professional base, on those institutions experienced in this area, for example SZAMKI and the KFKI.

[Question] According to our information the MSZR does not have a better stock of peripherals than the ESZR. What are the commercial aspects of realizing a "peripheral acquisition conception" which has been much talked of and which takes into consideration the many capitalist sources?

[Answer] In the case of the MSZR machines we have done what we did in the case of the ESZR machines, we examined what peripherals could be used to improve the efficiency of the system. In the course of preparing plans pertaining to an expansion of thesystem we take into consideration the products available from socialist countries and the equipment which can be obtained from western countries. We consider capitalist acquisition justified primarily in cases where equivalent products, from the viewpoint of performance and reliability, are not available on the socialist market, for example, in the case of larger capacity background storages.

[Question] Finally, one more question. What is the situation with service and parts supply? Has the OSZV prepared to provide uninterrupted operation?

[Answer] This year technical services for the SM 4 computers will still be provided by the manufacturing enterprise, which has the equipment and the supplies. In 1981 the NOTO-OSZV will take over technical services. We will receive the tools and parts necessary for this in the second quarter of this year.

8984
CSO: 2502

# PROBLEMS IN CONNECTION WITH TECHNOLOGY AND CHOICE OF MATERIALS FOR HARD-SURFACING BY ARC WELDING

Budapest GEP in Hungarian Vol 32 No 3, Mar 80 pp 81-84

BERES, LAJOS, Dr, Technical University for the Heavy Industry; and
BODORKOS, GELLERT, Dr, Institute of Machine-Industry Technology

[Abstract] Methods of choosing technology and materials to prevent abrasive and corrosive wear on the surfaces of metal parts by hardsurfacing are discussed. The alloy is selected on the basis of expected service conditions, final properties and the technology of the application of the layer. The chemistry of 33 layer compositions is listed and tabulated together with the resistance characteristics when applied as a welded-on surface. Economic factors must also be taken into consideration, including costs of materials and any required jigs and fixtures. The sequence of procedures is as follows: selection of the alloy, selection of the method of surfacing, clarification of the technological parameters of surfacing, setting up welding conditions for surfacing, figuring the final heat-treat schedule and determining the final surface finishing procedures. A very important characteristic of a satisfactory layer is resistance to etching and cracking. Material compatibility is also a major factor. A price comparison is provided for the materials FOX DUR 650 Kb, DUR 650 JG, DUR 600 FD, CMSH UP, EMA 60, and CMW-BS together with jigs and fixtures. The aim of the tables presented is to assist in the selection of suitable materials, auxiliary items, and methods for specific applications other than those covered in the relevant literature. However, since the possible working conditions vary widely, even this information will provide estimates only. Tables 4, references 4: 1 Hungarian, 1 Russian, and 2 Western.

2542
CSO: 2502

POLISH ACADEMY OF SCIENCES ACTIVITIES, PERSONNEL

Warsaw NAUKA POLSKA in Polish No 10, Oct 80 pp 115-136

[Excerpts from the Chronicle section of NAUKA POLSKA]

[Excerpts] Meeting of Polish and Soviet Economists

A discussion meeting of Polish and Soviet economists was held in Zalesie near Warsaw between 3 and 6 July 1979. The meeting was convened by the Institute of Fundamental Problems of Marxism-Leninism (IPPM-L) under the PZPR Central Committee and devoted to the problems and prospects of the socioeconomic development of the socialist countries in the 1980s. In the discussions, special attention was paid to the complete utilization of the structure of the socialist system to intensify that development; problems of expanding socialist economic ooperation within the CEMA framework also were considered from that standpoint.

The meeting was attended by scientific workers from the IPPM-L, the WSNS [Higher School of Social Sciences] under the PZPR Central Committee, and the Polish Academy of Sciences--and on the Soviet side, by representatives of the Institute of Marxism-Leninism and the Academy of Social Sciences under the CPSU Central Committee, as well as of the USSR Academy of Sciences.

Effect of Pollutants on Vegetation

The International Symposium on the Effect of Air Pollution on Vegetation was held in Warsaw from 20 to 24 August 1979 under the auspices of the UN Economic Commission for Europe and as a result of international agreements by Polish scientific institutions as well as of agreements with the Secretariat of the Economic Commission for Europe and the UN Bureau of Environmental Protection Program. The symposium was attended by about 60 eminent experts from Europe and America as well as by about 70 experts from Poland's scientific research centers.

The subjects discussed concerned the effect of various airborne pollutants on vegetation--chiefly on crops and forests--as well as their consequences on the international, national and regional scale. The role of the vegetation in eliminating and counteracting the effects of pollution was also considered.

These topics were comprised in five groups dealing with: information on types of pollutants, their sources, means and scope of their transportation, and factors influencing the migration of pollutants.

The symposium participants exchanged their observations of the state and effect of air pollution on vegetation in their countries and discussed the economic problems due to the spread of pollution--the losses of biological, agricultural, and forest production. The attendant legal problems also were considered.

Ultimately, guidelines and recommendations for action were agreed upon with respect to individual countries, international organizations, and research institutes, with the object of reducing the sources of pollution and acting to eliminate the consequences of pollution.

Aerial Photography and Geographical Research

The All-Polish Conference on the Utilization of Aircraft and Satellite Photographs in Geographical Research was held on 21 and 22 September 1979 in Katowice. The conference, organized by the Institute of Geography at Silesian University jointly with the Photointerpretation Commission of the Geographic Society, was attended by 130 experts--basic researchers as well as practitioners, representing various schools and institutions and various research disciplines.

The agenda included 50 papers dealing with methods for utilizing new remote-sensing techniques, analyses of the information capacity of photographs, photogrammetric problems, and problems of practical utilization of photographs and satellite imagery in agriculture (determination of plant diseases), soil science, geology, and hydrology.

During the conference the first Polish film in this field, "Geographic Interpretation of Aerial Photographs," was shown. The film was produced on the basis of a scenario developed by Katowice scientific workers.

"Systems Science VI" [Given in English]

The Polish Committee for Measurements and Automation and the Institute of Cybernetic Engineering at Wroclaw Polytechnical School convened the "Systems Science VI" International Conference in Wroclaw from 10 until 13 September 1979, in cooperation with major foreign centers. It was attended by about 250 experts from 18 countries, including Egypt, Finland, France, India, Mexico, the FRG, the United States, Venezuela, Great Britain, Italy, and the the USSR.

About 100 papers were presented. These included the works of eminent scientists such as Prof A. Ayzerman from the USSR, Prof H. J. Kushuer and Prof W. R. Wells from the United States, Prof R. Valee from France, and Prof Z. Bubnicki from Poland. New advances and actual developmental trends of systems engineering, i.e., of methods for the analysis and design of

complex systems of various types, were represented and discussed. Problems of utilizing computer technology to simulate engineering systems and production control and management also were discussed. Many papers dealt with the introduction of systems engineering techniques in power systems, economic systems, and even biological systems. Emphasis was placed on the great significance of the presented papers to the further development of pratical applications of cybernetic techniques and means of information science to the design of engineering systems and computerized control and management systems.

At the end of the conference awards were presented for best projects submitted by young scientific workers. The poles who received these awards were M. Pstrokonski (Warsaw), E. Rafajlowicz (Wroclaw) and J. Klamka (Gliwice).

It was resolved to hold the next conference of this type in 1980 in Great Britain, with the cooperation of the Institute of Cybernetic Engineering, Wroclaw Polytechnical School.

Noise Control

The Eighth International Congress "Internoise 78" [Given in English] devoted to noise control problems was convened in Warsaw from 11 to 13 September 1979 by the Institute of Fundamental Problems of Technology at the Polish Academy of Sciences [PAN], the PAN Committee on Acoustics, and the Polish Acoustics Society, in cooperation with the Institute of Mechanics and Vibroacoustics, AGH [Academy of Mining and Metallurgy] in Krakow, and under the auspices of the International Institute of Noise Control.

The discussions, in which some 500 experts from about 40 countries took part, dealt with problems of combating and counteracting the effects of noise as well as with a review of the latest achievements in these fields. About 200 papers presented dealt with specific noise control projects.

The conference was accompanied by an exhibition of antinoise equipment and materials as well as of measuring instruments, held at the Palace of Culture and Arts.

International Seminar on Acoustics

The PAN Committee on Acoustics, the Polish Acoustics Society, and the Institute of Telecommunications and Acoustics at the Wroclaw Polytechnical School convened the 26th Open Seminar on Acoustics in Olesnica from on 18 and 19 September 1979. The purpose of this annual seminar was the exchange of ideas and experiences concerning the acoustics research under way in various scientific and industrial centers in this country and abroad.

The seminar was attended not only by Polish acoustics experts representing all the acoustics centers in this country but also by representatives of this discipline from Greece, France, the GDR, Romania, Hungary, and the USSR. The program of the seminar included aspects of every domain of acoustics, but especially vibrations and noise, ultrasound, and speech acoustics.

## Discussions at the "Eucarpia" Section in Radzikow

The Institute of the Breeding and Acclimatization of Plants in Radzikow near Warsaw was during 2-4 July 1979 the site of the discussions of the Section on Cereal Plants of the Eucarpia European Association for Research Into Plant Breeding. The discussions dealt with the breeding of triticale (wheat-rye)--a new variety of grain representing a cross between wheat and rye.

The discussions were attended by scientists and plant breeders from the socialist countries, as well as from the capitalist countries of Europe, Asia, and America.

In Poland the work on breeding triticale is conducted by the scientific research stations of the Institute at Radzikow, of the Association for Seeding and Horticulture, and of the PAN Institute of Plant Breeding in Poznan. Six varieties of wheat-rye are currently being grown experimentally for the second year in a row at state enterprises.

## Problem of Livestock Feeding

A scientific session devoted to the role of coarse fodder in livestock feeding was held on 18 and 19 September 1979 at Szczecin under the auspices of the PAN Commission for Livestock Feeding in cooperation with the Szczecin Agricultural Academy. Representatives of the zootechnical sciences took part in this session.

The discussions were inaugurated by Prof Stefan Seidler, whose paper concerned the problem of hay and its role in livestock feeding. Scientific workers from many of the nation's stations, including Krakow, Poznan, and Wroclaw, presented projects based on actual experience concerning a rational yet thrifty and effective feeding of cattle, hogs, and sheep, on discussing among other things such problems as the advantages of the conservation of grasses and papilionaceous plants and the feeding of sheep with feeds treated with urea or dry corn silage and beet pulp.

## Transformation of the Countryside and Agriculture

On the 35th anniversary of the Land Reform Decree of the PKWN [Polish Committee of National Liberation] a national symposium was held in Lublin on 19 and 20 September 1979. The symposium, convened owing to the efforts of the Central Board of Agricultural Circles and the WZKR [Wielkopolski Union of Agricultural Circles] in Lublin, was devoted to discussion of the postwar transformations of the countryside and agriculture in this country. It was attended by scientific workers from various centers in Poland, land reform organizers, and rural self-government activists.

In the discussions, as well as in the papers presented by, among others, Prof Konrad Bajan from WSNS [Higher School of Social Sciences] under the PZPR Central Committee; Prof Dyzma Galaj, director of the PAN Institute for

the Development of the Countryside and Agriculture; Prof Franciszek Kolbusz from the Agricultural Academy in Krakow; Prof Ryszard Orlowski from the UMCS [Marie Curie-Sklodowska University] in Lublin, and the chairman of the CZKR [Central Board of Agricultural Circles], Jozef Krotiuk) it was stressed that the land reform was of tremendous socioeconomic importance to the reconstruction of the country as well as to agriculture itself. Fundamental changes gradually took place in agriculture. At the time a major task was the development of the recovered western and northern territories, on which 4 million hectares of land was granted to peasants. It was pointed out that the assurance of favorable conditions for the development of production in every sector of agriculture resulted in a major intensification of farming and in an increasingly more productive agriculture, in the expansion of the industry producing the means of production needed by agriculture, and in the modernization of the processing of foodstuffs. It was further stated that rural self-government, especially the agricultural circles, should be a major factor in a more rapid exploitation of the foodstuff potential.

The participants in the symposium toured socialized and private farms in the Lublin Voivodship and familiaried themselves with the activities of various institutions serving the countryside and agriculture.

On the same occasion the Association of Polish Geodetists and the Ministry of Agriculture in Chelm Lubelski convened from 27 to 29 September 1979 an all-Polish scientific session devoted to transformation of agriculture.

The discussions were attended by about 300 geodetists. The papers presented and the discussions reflected the contributions and trends of activity of geodetic services with respect to further improvements in farming. It was stressed that, among other things, the total arable acreage in Poland is steadily diminishing, this being inevitable in the era of a rapid development of industry and of the entire economy. The point, however, is that the process of the utilization of land for nonagricultural purposes should be maximally restricted to the most indispensable actual needs, while at the same time rationally exploiting every possibility for improvements in land utilization. The activities of the geodetic services in the last 5 years assured the recultivation of 30,000 hectares of land, the adaptation of 34,500 hectares to agricultural production, the removal of stones from 197,000 hectares, and the fertilization of 350,000 hectares.

On the occasion of the session, several score honored geodetists and land reform pioneers were awarded high state decorations.

Opening of Polish Institute in Paris

The Polish Institute was opened in Paris on 4 September 1979. The ceremonial opening was performed by the Minister of Culture and Arts, Polish People's Republic, Zygmunt Najdowski, and French Minister of Culture Jean-Philippe Lecat, along with the Polish deputy minister for Foreign Affairs, Jozef Czyrek, and the secretary of state at the French Ministry of Foreign Affairs, Olivier Stirn, as well as the Polish Ambassador in Paris, Tadeusz Olechowski, and numerous present representatives of the French cultural world.

The new institute will fill a long-felt gap for the many Poles living in France as well as for Frenchmen interested in Polish culture and its development. The Institute will organize film showings, concerts, lectures, meetings with Polish artists, exhibitions of their works, etc. It will be both a site for meetings with representatives of Polish culture and a site for public gatherings accessible to all.

The director of the institute is Jerzy Piatkowski, former deputy director of the Department of Press and Information in the Ministry of Foreign Affairs.

On the occasion of the opening of the Polish Institute a ceremonial concert was given at the Paris seat of UNESCO by Halina Czerny-Stefanska, Krystyna Szostek-Radkowa, and Leonard Andrzej Mroz, who presented a repertoire of works by Polish and French composers.

1386
CSO: 2602

NUCLEAR PHYSICS PLAN, DEVELOPMENT OUTLINED

Warsaw NAUKA POLSKA in Polish No 11, Nov 80 pp 3-35

[Excerpts from article: "State and Developmental Prospects of Physics in Poland"]

[Excerpts] Table 1 provides an overall picture of the thematics of individual problems and of the funds allocated for their implementation under the current 5-year plan. The outlays planned for the 1976-1980 on research into these nine problems amount to 3,637,383,000 zlotys. The largest share of the outlays during the current 5-year plan is earmarked for research into solid state physics (1,320,273,000 zlotys) and nuclear physics (748,110,000 zlotys), and the lowest, for research into theoretical physics. As I pointed out previously, these nine problems account for the most but not all of the physics research being done in Poland. Part of the research conducted at certain centers pertains to physics problems of other types or is associated with independent research conducted at the centers. Thus the actual expenditures allocated for physics research in Poland during 1976-1980 are higher than the 3,637,383,000 zlotys specified above, but the difference is extremely difficult to estimate. For a better coordination of research and clearer identification of its thematic and financial scope it would be expedient to consider the possibility of focusing the maximum possible research potential on problems of a purely physics nature and to include the previously omitted teams of researchers into the research coordinated by physics laboratories.

Consider the sum of 3,637,383,000 zlotys allotted for physics research in this country during the 1976-1980 period. Is that too much or too little? The experience so far shows that the allotted funds are adequate. In general, the laboratories pose no fundamental postulates in this respect. The main problem is not the amount of zlotys allocated but the continuing lack of hard-currency funds. We all are aware of the tremendous advances made in experimental techniques and of the steady rise in the cost of equipment, yet the hard-currency funds allotted to the laboratories are immeasurably below the needs. As a result, scientific laboratories experience lack of modern research equipment, which in its turn restricts the possibilities for conducting research at the world level in many fields of physics. Such a situation reigns in low-energy nuclear physics, in which the conduct

of research in accordance with the worldwide trend requires using extremely large accelerators, whereas those available in this country are only the 3.5 MeV accelerator in Warsaw, the 10 MeV linear accelerator in Swierk, and the 28 MeV alpha-particle accelerator in Cracow. That experimental base is inadequate and obsolete. As a result, research in this field of physics is conducted chiefly through collaboration with foreign laboratories operating up-to-date accelerators such as the center in Darmstadt with its machine accelerating uranium ions to the energy of 6 MeV/nucleon and the center in Dubna with its xenon and krypton ion accelerator, or, too, the center in Berkeley with its machine accelerating heavy ions to energies of GeV/nucleon. The current world position of Polish centers for research in nuclear physics assures a relatively easy access to the largest accelerators. We hope, that this will continue. The heavy ion cyclotron which is to be activated in Warsaw in 1983 will greatly improve the situation. It will accelerate ions to energies of 10 MeV/nucleon. This also concerns the possibilities of our laboratories as regards the implementation of the final stage of research, i.e., the processing of experimental data with the aid of large computers. The increasing complexity of research problems requires using computers with increasingly faster operating speeds and larger memories. This is a different equipment problem, which besides concerns not just nuclear physics alone.

Low- and Medium-Energy Nuclear Physics. Speaking of low- and medium-energy nuclear physics, I mean structural research into atomic nuclei, research into effect of the state of concentration of matter on the course of nuclear processes and obtaining new data on the structure and dynamics of the condensation phase by methods of nuclear physics.

The unusually rich experimental material on the structure of atomic nuclei that has been accumulated over the year still cannot be explained by a unified theory, and hence new ways of elucidating many unsolved problems are being sought that could contribute to constructing a theoretical model of the nucleus and that could account for the voluminous experimental results obtained so far.

Research in recent years is focusing on atomic nuclei existing in states that are greatly different from the "typical" states existing in nature.

To obtain information on nuclear forces and determine parameters in their phenomenological description, research is under way on nuclei distant from stable nuclei with a large excess or scarcity of one or other kind of nucleons, their mass, and concentration states, and the comparison of the findings with the theoretical model allows its verification. Thus, e.g., the subject of research is rapidly spinning boundary nuclei or, more exactly, the observation of their metastable states with relatively high excitation energies, since the features of these states (spin, energy) are highly sensitive to details of the theoretical model. Rotational bands of deformed nuclei are being investigated with the object of creating nuclei in increasingly higher spin states. This research is expected to corroborate theoretical suggestions concerning the effect of the spin velocity of deformed nuclei in fundamental state on their symmetry and decay.

Another subject of research is collective excitations of high-energy nuclei, i.e., the so-called giant resonances, as well as nuclear matter in high-density states. In the latter case, owing to bombardment of nuclei with other high-energy nuclei (of the order of 1 GeV/nucleon), shockwaves are expected to arise in nuclear matter; in these shockwaves the nuclear matter should become several times as dense as the mean densities of the nuclei. Theory predicts that certain densities of nuclear matter can be energetically advantageous, which could result in the formation of the so-called density isomers.

In the above-mentioned experiments we observe nuclear reactions caused by heavy ions accelerated to high energies (with the exception of giant resonances, which are observed on bombarding nuclei with alpha particles). The use in most of these experiments of heavy ions accelerated to high energies stimulates exact research into the mechanisms of reactions between heavy ions and nuclei.

The experimental base in this country does not allow conducting research in the most topical directions. Thus such research is conducted in collaboration with foreign laboratories that operate up-to-date accelerators.

In this country research into the structure of atomic nuclei is conducted chiefly in Cracow, Swierk, and Warsaw, as well as, to a much smaller extent, at the Lublin laboratory, at which basic research is developed.

In Cracow the research is chiefly focused on the already traditional Polish field--research into various aspects of the interaction between alpha particles and nuclei. The results achieved so far, e.g., in the work on an optical model of the action of alpha particles, on the anomalous scattering of these particles at angles close to 180°, and on the decay of alpha particles owing to the action of nuclei in collisions at 100 MeV energies, are known and valued in the world. Also conducted is reaserch intended to elucidate the structure of nuclei from the so-called f-p sheels and transition nuclei. Mention should also be made of the research into the effects providing information on the clastryfication of nuclei. Part of that research is performed in collaboration with foreign laboratories such as Julich, Strassbourg, Maryland, Lourain-la-Neure, and Heidelberg.

The topics of the research being done in Warsaw and Swierk include, among others: mechanisms of the radiative capture of protons and of its application to spectroscopic research; mechanism of the reactions generated by fast neutrons, particularly the (n-alpha) reactions; nucleon transfer reactions; and structures of nuclei from the so-called transition region between spherical and deformed nuclei. In addition, in collaboration with foreign centers such as Dubna, Strasbourg, Zurich, Grenoble, Bloomington, Groningen, Heidelberg, Lund, Debrecen, Orsay, and Berkeley, experimental research is under way into high-spin nuclear states, giant resonances, and nucleon transfer in reactions at energies below the Coulomb barrier, along with research into the stucture of nuclei from the transition region, nuclei distant from stable nuclei, mechanisms of action of heavy ions, etc.

Some of the above topics have been added to the research programs of the above-mentioned foreign centers on the initiative of the Polish party. The world prizes highly the work of Polish theoretical research teams on the collective movements of nuclei.

The current tragic situation as regards the possibilities for conducting important experiments in this country should be alleviated by the completion and opening in the next few years of the heavy-ion cyclotron in Warsaw as well as by the planned modernization of the Cracow cyclotron in the early 1980s with the object of enhancing the particle acceleration energy and assuring its regulation.

Work in the field of thermonuclear physics to synthesize superdense plasma by methods of multiple-current discharge, laser implosion, and implosion generated with the aid of conventional explosives, is being conducted in Swierk and Warsaw. Basic research into thermonuclear chain synthesis proceeds at a high level. The originality of the concept assures maintaining that research at a world level despite the inadequate experimental base.

A somewhat different thematic group is represented by research into the effect of the state of concentration of matter on the course of nuclear processes. This reasearch is dictated not only by purely epistemological needs but also by the needs of the national economy. Work in this direction is being chiefly developed in Cracow, Swierk, and Warsaw, but laboratories in Czestochowa, Katowice, Lublin, and Wroclaw also take part in it. Several research methods have been refined, especially Mossbauer spectroscopy, which provides information on both the location and microdynamics of impurities in metal lattices, as well as on internal hyperfine--electrical and magnetic--fields in solids. Mossbauer spectroscopy has been used to obtain important metallurgical data on the reductive properities of iron ores. Research is under way into the magnetic properties of certain metal compounds and into the atomic and magnetic ordering of iron in alloys of technological importance. Other research conducted concerns the effect of hyperfine impurities implanted in surface layers of metals. The techniques of Mossbauer spectroscopy used in this connection serve to obtain valuable information of essential importance to electronics, metallurgy, and meteorology as well (data on air pollution).

Other methods such as measurements of perturbed directional correlations and angular distribution of gamma radiation, and the position annihilation method, are used in , e.g., research into radiation defects.

The effect of microimpurities on nuclear processes is also being investigated. In recent years research into perfecting the ion-implantation techniques has been undertaken.

The neutron scattering method has been developed: this method is used, in particular, in research into the structure and dynamics of the condensed phase of matter, such as molecular movements in the condensed phase and their nature and role in phase transitions. An object of research is various

aspects of reorientational degrees of freedom in liquid crystals. The work conducted has made possible the treatment of a phenomenological model of intermolecular effects and stimulated the increption of theoretical research into the development of a more fundamental theory of phase transitions in condensed systems. The undertaken basic and applied research concerning the dynamics of phonons in metal alloys and research into the properities of magnetic substances is focused on problems of structural determination, magnetic phase transitions, and the spectroscopy of paramagnetic ion levels split by magnetic fields. The inelastic neutron scattering method is used to investigate the crystal field and exchange effects in intermetallic alloys. The experimental possibilities will be broadened by the completion of the construction of new polarized neutron spectrometers, both at the MARIA reactor in Swierk and at the reactor of the United Institute for Nuclear Research in Dubna, USSR.

Closely connected to the program for exploratory research is the work in progress to improve measuring instruments and to put to practical use the developed measuring techniques and measurement findings. Nuclear data are being compiled and evaluated for the needs of reactor engineering and dosimetry as well as of nuclear technology. Special attention is being devoted to the development of modern methods for the detection and spectroscopy of nuclear radiation, to improvements in electronic equipment assuring the direct processing of the findings, and also to methods for microanalysis of surface strata in applications of nuclear reactions. These methods are used in many fields of modern technology, particularly in the investigation of semiconductor elements. A method for the analysis of proton-excited x-radiation, providing information of fundamental importance to technology, medicine, and environmental protection, has been developed. Work to develop nuclear methods for the prospecting for and identification of deposits of raw materials also is being conducted on a broad scale.

Beginning in 1980 the PAN Institute of Physics will handle the coordination of Degree-II Subproblem "Materials Technology in Outer Space," within the framework of the projected key problem "Development and Utilization of Space Research."

Table 1. Research Problems Coordinated by Physics Laboratories in Poland

| Ordinal Number | Problem | Coordinator | Outlays in '000 zlotys | |
|---|---|---|---|---|
| | | | Implemented in 1976-1978 | Planned in 1976-1980 |
| 1 | Main problem "Fundamental Research" (PR-3.8), comprised in government program "Materials and Subassemblies for the Introduction of Electronics" | II Deg. PAN Institute of Physics | 269,700 | 794,573 |
| 2 | Key problem "Nuclear Process Research and Application of Nuclear Technology to the Nation's Socioeconomic Development" 04.3 | II Deg. PAN Institute of Nuclear Physics | 531,702 | 748,110 |
| | Topics: | | | |
| | 10. Development of nuclear methods for exploration and identification of raw material deposits | | | |
| | 14. Reserach into properites of high-energy nuclear reactions, their interpretation, and development of theory to determine the laws governing elementary ingredients of matter | | | |
| | 15. Research into the structure of atomic nuclei | | | |
| | 16. Research into the effect of the state of concentration of matter on the course of nuclear processes | | | |

[Table 1 cont'd]

| Ordinal Number | Problem | Coordinator | Outlays in '000 zlotys: Implemented in 1976-1978 | Outlays in '000 zlotys: Planned in 1976-1980 | |
|---|---|---|---|---|---|
| | 17. Obtaining new data on the structure and dynamics of the condensed phase of matter with special allowance for the neutron scattering method | | | | |
| 3 | Interministerial problem "Structure and Electron Properties of Solids" (MR-1.4) | PAN Institute of Physics | 288,200 | 525,700 | |
| 4 | Interministerial Problem "Processes of Interaction Between Radiation and Matter" (MR-1.5) | University of Warsaw | 164,654 | 380,000 | |
| 5 | Interministerial problem "Galaxies, Stares, the Solar System (MR-1.8) | PAN Astronomical Center | 38,807 | 71,000 | |
| 6 | Interministerial problem "Fields, Particles, Space-Time" (MR-1.7) | University of Warsaw | 19,821 | 50,000 | |
| 7 | Interministerial problem "Structure, Theory, Properties, and Dynamics of Molecular and Condensed Systems" (MR-1.9) | Institute of Low Temperatures and Structural Research, PAN | 262,656 | 500,000 | |
| 8 | Interministerial problem "Geodynamics of the Area of Poland" (MR-1.16) | Institute of Geophysics, PAN | 167,715 | 362,000 | |
| 9 | Interministerial problem "Studies of Interplanetary and Circumterrestrial Space and Their Utilization" (MR-1.29) | Center for Space Research, PAN | 73,031 | 210,000 | |
| | | | 1,816,286 | 3,637,383 | Total |

OCEAN RESOURCES ENGINEERING DEVELOPMENT OUTLINED

Warsaw GOSPODARKA PLANOWA in Polish No 3, Mar 80 pp 158-162

[Article by Jerzy W. Piskorz-Nalecki: "Exploiting the Riches of the Ocean, Its Significance and Prospects"]

[Excerpts] Poland and other socialist countries, especially the USSR, the Korean People's Democratic Republic and Vietnam, possess tremendous expanses of contiguous continental shelves which are now being or will be exploited in forthcoming years. Also, the CEMA countries are interested in exploiting the resources of the open seas. In the next few years joint research will be undertaken and joint exploitation will be organized. Thus, it is certain that interest will increase rapidly regarding construction of technical systems (scientific research ships, drilling ships, units for operation at deep depths, manned and unmanned submersibles, and deep-depth diving systems) to exploit ocean resources. The experience to date of Poland's shipbuilding industry and its current work in constructing ocean resources engineering facilities, especially for the USSR, as well the increased involvement of Polish scientific institutions in ocean resources engineering research form a good basis for specialization (within the CEMA framework) in the construction of systems and equipment used to investigate and exploit ocean resources.

Ocean Resources Engineering, Its Status and Prospects

The growth of shipbuilding in Poland, the overall rapid growth of the Polish economy and the growth in the technical level of industry created good foundations for the expansion of this area of marine engineering. This was used for the development of ocean resources engineering already in the 1970's, before construction began of hydrographic ships and other ships used to research the oceans. Practically all Polish shipyards are contributing to the development of this area of shipbuilding; the production of this type of ship is concentrated at the A. Warski Shipyard in Szczecin. The direct base for undertaking this production was the hydrographic ship built at the Westerplatte Polnocny Shipyard in Gdansk and the A. Warski Shipyard in Szczecin. The first series of ocean-research ships were the scientific research ships of the M/S Poryw type built at the Szczecin Shipyard during the 1969-1971 period. Nine of these ships were built for the USSR's hydrographic service. These ships were equipped with appropriate laboratories,

equipment to gather water samples and to deploy measuring buoys, and with meteorological rocket launchers. This equipment was used to observe water surfaces and the atmosphere in various parts of the world ocean for weather forecasting purposes. These ships, which are also used to conduct simultaneous investigations in various parts of the world, are examples of a universal system of marine technology. The Szczecin Shipyard has been building various types and sizes of hydrographic ships for 10 years.

During the 1972-1974 period, a number of technical and design studies were done at the Szczecin Shipyard to make it possible to produce semi-submerged surface platforms, structural elements and modules for equipping stationary ocean drilling rigs for the North Sea. This work allowed numerous groups of designers and technicians to become well acquainted with design problems and technology and to obtain experience in these areas. The work was based on design documents procured from foreign contractors and on detailed technical information. This permitted the Szczecin Shipyard to give technical aid to the Szczecin Steelworks which together with the Ferrum Steelworks built structural elements for semi-submerged surface platforms for Norwegian contractors during the 1974-1977 period.

In 1973 Gdansk's Lenin Shipyard built the Professor Siedlecki, a unique research ship used to investigate ocean fish resources. This ship, equipped with appropriate fishing gear (changeable according to research needs), a number of laboratories and its own computer center, is used to investigate the resources of new fighing areas and to master new fishing techniques. Another contribution by Poland's shipbuilding industry in the development of ocean resources engineering is the conversion of the M/S Kopernik to perform geophysical research and equipping it with a modern seismographic devices.

Undoubtedly a milestone in this area will be the construction at the Szczecin Shipyard of a series of new scientific research ships for the USSR Academy of Sciences, which will be used to conduct comprehensive biological and geophysical research on all oceans of the world and at all depths. The construction of these ships began in 1980. Each ship will contain 26 different types of laboratories that will enable data to be collected with the aid of numerous research measuring devices and a large onboard computer center that will automatically process the data. This will be the most specialized ship of its kind in the world.

It must be emphasized that the shipbuilding industry must design and build diving equipment for depths up to 250 m. The construction and equipping of such devices at the Szczecin Shipyard will be a new stage in the building of the most complicated ocean resources engineering equipment to be mastered by the Polish shipbuilding industry. This will permit the shipbuilding industry to expand and intensify its world share of this production. Having this distinction at the present moment enabled the Szczecin Shipyard to start the construction of geological exploration ships and drilling ships which will be built during the 1983-1985 period for the USSR. Also, the Szczecin Shipyard started constructing different types of supply ships. This is

attested to by the decisive entrance of Poland's shipbuilding industry in dominating this type production and in increasing its share of the production program. Currently the Design Studies Office of the A. Waeski Szczecin Shipyard is designing a new type ship to exploit the world's oceans. These type of ships are scheduled to be built during the 1985-1990 period and thereafter. Specifically, the design is for a ship used to extract metal ores from the ocean floor beds that are at great depths as well as the treatment of these ores. Additional design and research work is also being done on mastering the functional and auxiliary systems of these ships, for example, systems to extract ferromanganese nodules from the ocean floor as well as submersibles. Simultaneously, work is proceeding on mastering the new technological processes associated with the production of ocean resources engineering ships. In particular, this concerns welding technology for pressure tanks as well as other material and construction problems. A test and research stand has been built at the Szczecin Shipyard; this will permit expanded production of other devices for underwater work at great depths.

A characteristic of this type production is its high research intensiveness which requires adequate outlays for lead-time research. This work should be concentrated on mastering methods for designing research ships and other ships, and on methods for designating their characteristics, features as well as functional systems and equipment. In particular, research on the maritime characteristics of the designed ships is needed.

These are projects in the realm of hydromechanics as well as in the realm of automatic steering systems using maneuvering devices. Other research should concentrate on ship main propulsion problems for purposes of exploitation, especially in mastering diesel-electric propulsion and its interelated problems.

The construction of research ships requires type classification and modularization of research equipment as well as of the computer and control equipment by means of some research-measuring processes.

Developing sample-collections systems and executing analyses, especially via the in situ method, are unusually complicated fields. Mastering the production of systems and equipment for underwater work requires proper construction materials and methods for their assembly as well as materials for equipment components. It also is necessary to master the production of electric motors, cable joints and spools for operation at great depths, and proper lighting equipment. Appropriate underwater television and communication systems and systems to automatically control the position and spatial situation of the equipment are other problems that are of concern.

This also requires mastering the design of lift, control and measuring systems. A completely separate and unusually extensive field of research is mastering the production of underwater drilling equipment and systems.

Poland has all the data to become one of the leading world producers of ocean resources engineering systems.

11899
CSO: 2602

COMPUTER TECHNOLOGY DEVELOPMENTS IN TIMISOARA

Bucharest ROMANIA LIBERA in Romanian 11 Apr 80 pp 1,2

[Article by I. Medoia: "The Brains of Romanian Computers"]

[Text] A nearly incredible leap from the teaching computer MECIPT to the MOS semiconductor memories manufactured to world technology standards. Intelligence of memories made in Timisoara, an export of Romanian creativity. In 1968, 12 persons were fascinated by computer technology; today there are more than 600 specialists. During the next five-year plan, Timisoara will become a powerful site of Romanian electronics.

Timisoara, where some two decades ago an enthusiastic collective of university teachers at the Polytechnic Institute created the first Romanian computer, named MECIPT and intended for teaching purposes, is today a powerful center of Romanian electronics, performing at the level of world technology. The path to this leading branch of advanced technology was paved by our party and state policy of utilizing the technical and human potential of our specialists, who have raised the level of competitivity year after year, while increasing their daring and dedicated work. In short, the road to this branch of modern technology has been as short as it has been spectacular and revealing: "In about 1968," remembers physicist Tiberiu Ilim, technical director of the Center for Scientific Research, Technical Engineering, and Industrial Production for Computer Technology, in Bucharest, and head of the Timisoara branch, "we were merely carrying out studies to prove that we were also capable of producing electronic memories in Romania. This was so to speak, the first step on this less-than-smooth but hopeful road, despite the fact that at that time there were only 12 people in Timisoara who were fascinated by the mysteries of computers. National economy needs forced us to acquire a computer license in the following year. But we stubbornly refused to also buy a license for its memories, being more determined than ever that the latter would bear the brand and imprint of our specialists' creativity. It is true that this obstinacy has cost us many days and even nights of assiduous work, of impassioned research in a new field, very little known in our country at that time. But the more difficult the beginnings, the greater was the satisfaction of our first achievement -- the memory for the FC-15 billing

and accounting machines. It was a fairly simple, even rudimentary memory, but it was ours, and even more importantly, it opened new and almost unsuspected horizons for Romanian computer technology.

A visit to the Timisoara branch of the center more than confirms the fulfillment of these dreams after less than 12 years of activity. What was the most concrete meaning of this interval for the Timisoara specialists? The foundation of a powerful research and production center, including the construction of a modern memory plant, unique in the country -- and not incidentally located here in Timisoara -- which provides the brains for Romania's entire computer production. And not any kind of memories, but the most competitive ones, from ferrite ring types to integrated ones of 8-32 kilobytes, and even with memory blocks of 256 kilobytes; these are products that place this collective at the level of countries with advanced computer technologies, since the Timisoara memories are usable in the many models of the Felix C-512 and Felix C-1024 computers. Among the exceptional products recently manufactured here are three types of MOS semiconductor circuit memories, already being mass produced, whose capacities and speeds are among the highest, more than twice as large as those using ferrites. And the design of the memories being produced in Timisoara must not be sought outside the country, but here, in the ingenuity of this skillful collective, because it is the one who formulated it all, including the technology used to manufacture these products. What is more, the real merits of these Romanian memories will bring about 9 million lei of currency into the country during this year. And the brains behind these memories, which so rapidly have become an export of Romanian intelligence during this symbolic year of the technical-scientific revolution, is the collective of more than 600 electronic specialists in Timisoara, despite their average age of only 25 years.

The near future will confer new dimensions to this leading branch in the city on the Begai River. They will stem from the new production capabilities which will be built here during the next five-year plan, whose foundations will be already laid this year: a new unit for computer technology production, including a mini-computer plant -- in other words a true electronic-oriented industrial site -- which by the end of the next five-year plan will double the present production; the preparations for this new leap have already begun. Some figures are revealing from this standpoint: during this year, for instance, the industrial production of the unit will be seven times higher than that in the first year of the five-year plan, while the size of the personnel has not even doubled. But new technologies are also being developed here in addition to the production itself (over 1200 specialists are working in research, collaborating closely with the teaching staff of the Polytechnic Institute), including various instruments for product testing (the value of equipment locally built during last year alone exceeded 12 million lei). All of these are directly reflected in a reduction of currency expenditures. For instance, the production of goods is 14 times higher than the 6500 lei obtained in 1967 per 1000 lei of currency. By investing its own intelligence instead of an imported one, the branch's collective will save nearly 1000 million lei of

currency. One detail about the sense of responsibility demonstrated by this collective, is that it fulfilled its planned tasks for the current five-year plan as early as 7 March, meaning that by the end of this year it will be able to return to the national economy an additional production of at least 450 million lei. These are just a few conclusive arguments for the spectacular assertion of the Timisoara electronics in the field of leading technology, in a branch that is as new as it is prestigious.

11,023
CSO: 2702

ROLE OF NUCLEAR PHYSICS IN WATER MANAGEMENT

Bucharest SCINTEIA in Romanian 16 Apr 80 pp 1,4

[Article by Prof Victor Marcea, corresponding member of the Academy, director of the Institute for Isotopic and Molecular Technology, Cluj-Napoca]

[Text] In addition to other more serious results, the earthquake of three years ago also had some curious effects, not devoid of annoying consequences. At Baile Olanesti, for instance, the tremor radically changed the composition of the mineral water from the various sources. And since it is well known that each source had a well established therapeutic purpose, each being applied for extensively studied and verified treatments, it is obvious that the change in the water's composition is of particular importance to the spa. What could be done under these circumstances? Fortunately, not long before, a research team from the Institute for Isotopic and Molecular Technology, of Cluj-Napoca, studied the isotopic composition of the waters, and in particular their content of heavy hydrogen isotope (deuterium). Immediately after the earthquake, the deuterium measurements were rerun and it was possible to determine in detail the manner in which the underground streams changed their courses and how the sources became intermixed, as well as observe how the earth resettles and gradually reaches a new equilibrium.

Eventually, the waters from before the earthquake were found in new sources, and when the resettlement became final, the entire therapeutic capability of the spa could be used, everything returning to normal, saving large amounts of investments and a highly prestigious medical reputation.

I have given this example because it illustrates the interplay of two major current concerns -- the application of nuclear physics and the rational management of water and hydrologic resources.

The intensive industrialization of our country has placed priority on the rational management of water resources for industrial needs, for energy, and for agriculture. The documents of the 12th Party Congress, in a series of actions on the part of the party and state leadership, stress the need for

an exemplary management of water, a natural resource of primordial importance. In its natural flow as a result of rain and snow, water drains and visibly gathers on the surface in rivers, lakes, and seas; but the circuit also closes underground in the form of springs, sheets of underground water, and veritable subterranean lakes which remain invisible. In conventional geology methods exist for detecting underground water and estimating the amounts accumulated, but there are two measurements that they cannot perform, except indirectly at best: determination of the water's origins and of its movement. Nevertheless, a knowledge of these factors is often of capital importance.

This is where isotopes come into play. In the Olanesti case we worked with deuterium, the heavy hydrogen isotope, whose great advantage is that it is not radioactive and does not decompose, and therefore has a practically infinite life. It always accompanies hydrogen and therefore can be found in water, although only in infinitesimal amounts of the order of one-hundredths of one percent. Evaporations, freezing, and condensation in the form of clouds or rain, change the deuterium content. Consequently, deuterium in the quantities indicated above is present in decreasing amounts in rivers, rain, and snow. That is what makes it possible to distinguish between mountain and low-land water, between the rains of winter and those of summer. What is more important, is to be able to accurately locate fossil water that has remained underground for thousands and millions of years, isolated from the natural circuit or participating very little in it.

This method would appear to be mainly of scientific interest, but on the contrary, it contributes -- at times decisively -- in extremely broad areas in almost all sectors of human activity. Where is water not used?

The digging of the Danube-Black Sea Canal, together with the irrigation of huge areas of Dobrogea, has also led to changes in water management in that part of the country. Among other things, it was observed tthere is a risk for the water to reverse in the canal, and that a number of new springs appeared throughout the southern zone of Dobrogea. What was the cause of this phenomenon, whose implications are so extensive? Was it an infiltration of sea water or of Danube water? Or was it that sheets of underground water had been released? A systematic isotopic study, complementing the hydrogeologic one, made it possible to accurately establish the source and movement of the subterranean water. Some of it came from irrigations, while some proved as a complete surprise to be mountain water from far away, although found in the immediate vicinity of the Black Sea! The research has enabled, and continues to aid, the adoption of judicious solutions for the construction of industrial objectives in that region of the country.

Thermal water, especially in the west of the country, represents an important natural resource which can be used both as a new source of energy, and for therapeutic purposes as in the case of Baile Felix and 1 Mai for instance. One can also include the thermal water of the coast, around

Mangalia, whose beneficial action is well known. It is also anticipated that the use of thermal water (especially for heating homes, greenhouses, and so on) can result in significant economies of fuel. The question is: where does this water come from, are the reserves limited or unlimited, and how much can be extracted from the earth without endangering its natural balance? Systematic research using deuterium measurements has disclosed a surprising result: the overwhelming majority of this water, including the Mangalia sources, is from the mountains. It was thus possible to delimit the Apuseni Mountains basins which are found in a specific region of thermal sources; it is true that fossil water was also found, whose exploitation is limited. This isotopic information has been and continues to be of great help in hydrogeologic prospecting and in the exploitation of the thermal water in those regions; it can be said that this information is today current practice in this domain.

In the Valea Oltului spas, studied with great attention, it was possible to demonstrate that hydraulic improvements will influence the mineral water sources in the immediate vicinity (such as those of Calimanesti and Caciulata). Protection perimeters were established in this manner, so that industrial constructions will cause no modifications whatever to the quality of the mineral water. In general, applications in this domain, carried out for nearly two decades, have proven to be extremely fruitful.

The Danube Delta has also been a very important objective. The equilibrium of the Delta water, eventual infiltrations of salt sea water, the mixing of salt and sweet water in the system of lakes at the south of the Delta, represent extremely important data for agriculture and fishing in this region. It was demonstrated that sea water does not penetrate under the Delta, but that on the contrary, mountain water preponderates at large depths, and in Lake Razelm for instance, it was possible to map the water coming from the sea and that entering from the Danube. In mining exploitations, the deuterium method allows a determination of the water which invades either underground galleries or open pit mines.

In addition to their practical interest, these results also represent a prestigious achievement of Romanian science. We must state here that Romania is one of the few countries in the world where the deuterium method has been applied systematically, on a large scale, consistently, and with outstanding results. Our research is known throughout the world and we receive foreign requests in this domain, which compels us to retain a leading position in the multiple applications of techniques formulated on the basis of nuclear physics data.

11,023
CSO: 2702

END

SELECTIVE LIST OF JPRS SERIAL REPORTS

## EASTERN EUROPE SERIAL REPORTS

EAST EUROPE REPORT: Economic and Industrial Affairs
EAST EUROPE REPORT: Political, Sociological and Military Affairs
EAST EUROPE REPORT: Scientific Affairs

## WORLDWIDE SERIAL REPORTS

WORLDWIDE REPORT: Environmental Quality
WORLDWIDE REPORT: Epidemiology
WORLDWIDE REPORT: Law of the Sea
WORLDWIDE REPORT: Nuclear Development and Proliferation
WORLDWIDE REPORT: Telecommunications Policy, Research and Development

# END OF FICHE DATE FILMED

3 July 1980

D.D.E.U.